

生化及急診檢驗科公告

公告事宜:因應實驗室自動化、更換生化及免疫檢測系統，修訂參考區間內容

公告對象:全院各科室

執行原因:自 112 年 8 月 23 日起生化及免疫檢驗系統全面更換為美商亞培核心診斷自動分析儀器 Alinity ci systems，故提供下列檢驗項目之參考區間，共分為四大類

- 一、參考區間有異動
- 二、參考區間有異動且新舊方法有明顯差異，提供相關係數，以利與舊方法評估相關性及追蹤
- 三、參考區間無異動
- 四、急診檢驗項目(部分項目參考區間異動，因應使用需求，治療用藥物，全數提供相關性係數)

一、參考區間有異動:

	項目	舊參考區間	新參考區間
1	AFP, alpha Feto Protein	≤7 ng/mL	≤8.78 ng/mL
2	ALP, Alkaline Phosphatase	50 - 190 U/L	40 - 150 U/L
3	ALT (SGPT)	男性：10 - 50 U/L 女性：10 - 35 U/L	0 - 55 U/L
4	Ammonia	Male：25 - 94 μg/dL、 Female：19 - 82 μg/dL	31 - 123μg/dL
5	Amylase	20 - 140 U/L	28 - 100 U/L
6	Amylase- Urine	< 460 U/24h	Random: Male: 16 - 491 U/L Female: 21-447 U/L 24 hr: 170-2000 U/L
7	Anti-HAV IgM	< 1(cut-off value):non-reactive ≥1(cut-off value):reactive	< 0.80 S/CO Nonreactive 0.8~1.20 S/CO Grayzone >1.20 S/CO Reactive
8	Anti-HAV	> 1.0(cut-off value):non-reactive ≤ 1.0(cut-off value):reactive	< 1.00 S/CO Nonreactive ≥ 1.00 S/CO Reactive
9	Anti-HBc (IgG+IgM)	> 1(cut-off value):non-reactive ≤1(cut-off value):reactive	< 1.00 S/CO Non-reactive ≥1.00 S/CO Reactive
10	AST (SGOT)	8 - 38 U/L	5-34 U/L
11	BUN- Urine	6 ~17 g/day	12 - 20 g/day
12	CA153	<25 U/mL	≤31.3 U/mL

13	CK, Creatine Kinase	10-160 U/L	Male: 30-200 U/L Female: 29 - 168 U/L
14	Cl, Chloride	95-105 mEq/L	98-107 mEq/L
15	Cl, Chloride - Urine	140-250 mEq/24hr	110 - 250 mEq/day
16	Creatinine	男性：0.7-1.4 mg/dL 女性：0.5-0.9 mg/dL	男性: 0.73 ~ 1.18 mg/dL 女性: 0.55 ~1.02 mg/dL
17	Creatinine - Urine	0.8-1.8 g/24h CCR test: 120±20 ml/min.	男性: 0.87 - 2.41 g/day CCR: 120±20 ml/min. 女性: 0.67 - 1.59 g/day CCR: 120±20 ml/min.
18	DHEA-S	male:1.20~13.4 umol/l female:0.96~11.0 umol/l	Male:(單位 umol/L) 11-14Y 0.5 - 6.6 15-19Y 1.2 - 10.4 20-24Y 6.5 - 14.6 25-34Y 4.6 - 16.1 35-44Y 3.8- 13.1 45-54Y 3.7 - 12.1 55-64Y 1.3 - 9.8 Female: (單位 umol/L) 11-14Y 0.2-4.6 15-19Y 1.7-13.4 20-24Y 3.6-11.1 25-34Y 2.6-13.9 35-44Y 2.0-11.1 45-54Y 1.5-7.7 55-64Y 0.8-4.9
19	Direct Bilirubin	≤ 0.2 mg/dL	0.0 - 0.5 mg/dL
20	Fe, Iron	(男)：60 - 160 μg/dL (女)：33 - 167 μg/dL	(男)：65 - 175 μg/dL (女)：50 - 170 μg/dL
21	Free PSA	FPSA/PSA ratio >20%	當 PSA 值為 4-10 ng/mL 時， 「free PSA/ PSA」比值與攝護 腺癌相關風險值如下： 0-10%: 27.6% Probability of Cancer >10-15%: 30.9% Probability

			of Cancer >15-20%: 17.9% Probability of Cancer >20-26%: 15.4% Probability of Cancer >26%: 8.1% Probability of Cancer
22	Glycated albumin	10.8-17.1%	11- 16 %
23	HDL-C	男性> 40 mg/dL 女性> 50 mg/dL	< 40 mg/dL:Major risk factor for heart disease >=60 mg/dL:Negative risk factor for heart disease
24	hsCRP	< 0.3 mg/dL	≤0.5 mg/dL
25	K, Potassium	3.5-5.3 mEq/L	3.5-5.1 mEq/L
26	Lactate	3 - 12 mg/dL	4.5 - 19.8 mg/dL
27	LDH	120 - 240 U/L	125 - 220 U/L
28	LDH-CSF	NA	≤ 40 U/L
29	Lipase	13-60 U/L	≤ 60 U/L
30	Methotrexate (Amethopterin)	48hrs: < 0.1 μmol/L ; 72hrs: < 0.05 μmol/L	48hrs: < 0.1 μmol/L ; 72hrs: < 0.05 μmol/L 中毒濃度 24-hour > 10 μmol/L 48-hour > 1.0 μmol/L 72-hour > 0.1 μmol/L
31	Mg, Magnesium	1.7 - 2.8 mg/dL	1.6 - 2.6 mg/dL
32	Mg, Magnesium - Urine	72-102 mg/24 hr	72.9 - 121.5 mg/day
33	Microalbumin	一.隨機尿液 Microalbumin<1.9mg/dL 二.24 小時 Microalbumin<30 mg/day 三.Microalbumin/Creatinine(UACR)<30 mg/g	ACR:< 30 mg/g 24 小時尿:<30 mg/day
34	Na, Sodium	137-153 mEq/L	136-145 mEq/L
35	Na, Sodium - Urine	40-220 mEq/24 hr	Male: 40-220 mEq/day Female: 27-287 mEq/day

36	NSE, Neuron Specific Enolase	< 16.3 ng/mL	1.95th percentile: 11.1 ng/mL 2.95% confidence interval: 9.0-12.4 ng/mL
37	Oral Glucose Tolerance Test (OGTT) 50g	NA	< 130 mg/dL
38	Oral Glucose Tolerance Test (OGTT) 75g	NA	妊娠糖尿病 One step 空腹:<92 mg/dL 1 小時:<180 mg/dL 2 小時:<153 mg/dL 糖尿病診斷(2 小時) <140 mg/dl 正常 140-199 mg/dl 糖尿病前期 ≥ 200 mg/dl 糖尿病
39	Oral Glucose Tolerance Test (OGTT) 100g	NA	妊娠糖尿病 two step 空腹 : < 95 mg/dL 60 分鐘 : < 180 mg/dL 120 分鐘 : < 155 mg/dL 180 分鐘 : < 140 mg/dL
40	P, Phosphorus	成人 : 2.5 - 4.5 mg/dL 兒童 : 4.8 - 5.6 mg/dL	2.3 - 4.7 mg/dL
41	r-GT	4 - 63 U/L	Male: < 55 U/L; Female: < 38 U/L
42	SHBG	male:< 4.60 ug/ml ; female:< 10.45 ug/ml	Male: 1.28 - 6.78 µg/mL Female: 1.88 - 14.74 µg/mL (data from Europe population)
43	Thyroglobulin	<55 ng/mL	3.68-64.15 ng/mL
44	TIBC	250 - 350 µg/dL	Male: TIBC 134 – 415µg/dL Female: TIBC 120 – 480µg/dL
45	Total Protein	6.0 - 8.0 g/dL	6.4- 8.3 g/dL
46	Total Protein -CSF	15-45mg/dL	CSF : 15 - 40 mg/dL
47	Total Protein -Urine	隨機尿液 : < 15 mg/dL 24 小時尿液 : 0.027 ~ 0.137 g/day 24 小時尿液蛋白排出量 (mg/day)=當天尿液總量(dL) x 尿 液蛋白濃度(mg/dL)。 Protein / Creatinine (UPCR) < 150 mg/g	Urine Random: 1 - 14 mg/dL 24 hour, at rest: 0.05 - 0.08 g/day 24 hour excretion:< 0.3 g/day Spot Urine Protein-to-Creatinine Ratio:< 200 mg/g

48	TrAb, TSH Receptor Ab	≤ 1.75 IU/L: negative > 1.75 IU/L: positive	1.95th Percentile healthy individuals: < 1.99 IU/L 2.Graves' disease cutoff: 3.10 IU/L
49	Uric Acid	(男) : 2.4 - 7.2 mg/dL (女) : 2.5 - 6.3 mg/dL	Male: 3.7 - 7.7 mg/dL Female: 2.5 - 6.2 mg/dL
50	Zn	正常 : > 80 ug/dL , 潛在 : 79-60ug/dL , 缺乏 : < 60 ug/dL	70 - 120 μ g/dL
51	β 2-Microglobulin-Urine	< 300 ng/ml	< 320 ng/ml
52	β 2-Microglobulin-Blood	660-2740 ng/mL	970 - 2640 ng/ml

二、參考區間有異動且新舊方法有明顯差異，提供相關係數，以利與舊方法評估相關性及追蹤:

以下項目尚無國際標準可追溯，建議進行治療追蹤時，基線評估

$y = \text{Abbott (新方法)}$; $x = \text{舊方法}$

	項目	舊參考區間	新參考區間	備註
1	Adenosine Deaminase (ADA)	血清 : 4-20 U/L	8 - 16 U/L	$y = 1.7958x - 2.6522$; $R^2 = 0.9669$
2	ADA- CSF	< 9 U/L	NA	$y = 1.0399x + 2.2919$; $R^2 = 0.9944$
3	ADA- 其他體液	胸水 : < 40 U/L 腹水 : < 30 U/L	NA	$y = 1.5545x + 1.6085$; $R^2 = 0.9847$
4	CA-199	< 34 U/mL	≤ 37 U/mL	$y = 1.6970x - 8.7505$; $R^2 = 0.8999$
5	PIVKA-II	男 : 11.2-28.6 ng/mL 女 : 8.4-27.8 ng/mL	11.12-32.01 mAU/mL (data from Japan population)	$Y = 6.9997x - 189.56$; $R^2 = 0.9595$

三、參考區間無異動:

	項目	舊參考區間	新參考區間
1	25-OH Vitamin D	缺乏 : ≤ 30.0 ng/ml ; 充足 : > 30.0 ng/ml	缺乏 : ≤ 30.0 ng/mL ; 充足 : > 30.0 ng/mL
2	Albumin	3.5 - 5.0 g/dL	3.5 - 5.0 g/dL

3	Anti-Tg Ab (ATG)	≤ 4.11 IU/mL	< 4.11 IU/mL
4	Anti-Tpo Ab (ATA)	≤ 5.61 IU/mL	< 5.61 IU/mL
5	Anti-HBc IgM	< 1 (cut-off value): non-reactive ≥ 1 (cut-off value): reactive	< 1.00 S/CO Non-reactive ≥ 1.00 S/CO Reactive
6	Anti-Hbe	> 1 (cut-off value): non-reactive ≤ 1 (cut-off value): reactive	> 1.00 S/CO Non-reactive ≤ 1.00 S/CO Reactive
7	Anti-HBs	< 10 (cut-off value): non-reactive ≥ 10 (cut-off value): reactive	< 10.00 IU/L Non-reactive ≥ 10.00 IU/L Reactive
8	Anti-HCV	< 1 (cut-off value): non-reactive ≥ 1 (cut-off value): reactive	< 1.00 S/CO Non-reactive ≥ 1.00 S/CO Reactive
9	Anti-HTLV I/II	< 1 (cut-off value): non-reactive ≥ 1 (cut-off value): reactive	< 1.00 S/CO Nonreactive ≥ 1.00 S/CO Reactive
10	BUN	5 - 25 mg/dL	5 - 25 mg/dL
11	Ca, Calcium	8.4-10.2 mg/dL	8.4 - 10.2 mg/dL
12	Ca, Calcium -Urine	100-300 mg/24h	100 - 300 mg/day
13	CA-125	< 35 U/mL	≤ 35 U/mL
14	CEA	< 5 ng/mL	≤ 5 ng/mL
15	Cholesterol	< 200 mg/dL	< 200 mg/dL
16	Cl, Chloride-CSF	122-132 mEq/L	CSF 122-132 mEq/L
17	Cortisol	AM: 3.7-19.4 μ g/dL PM: 2.9-17.3 μ g/dL	serum AM: 3.7-19.4 μ g/dL serum PM: 2.9-17.3 μ g/dL
18	C-peptide	0.78-5.19 ng/mL	0.78-5.19 ng/mL
19	Cu, Copper	(男) : 70-140 μ g/dL (女) : 80-155 μ g/dL	男性: 70 - 140 μ g/dL 女性: 80 - 155 μ g/dL
20	Cyclosporine	60~200 ng/ml	60 - 200 ng/mL
21	E2(Estradiol)	Males: 11-44 pg/ml; Females: Follicular phase: 21-251 pg/ml, Mid-cycle phase: 38-649 pg/ml, Luteal phase: 21-312 pg/ml, Postmenopausal Females not on HRT: <10-28 pg/ml, Postmenopausal Females on HRT: <10-144 pg/ml	男性: 11 - 44 pg/mL 女性: Follicular phase: 21-251 pg/mL, Mid-cycle phase: 38-649 pg/mL, Luteal phase: 21-312 pg/mL, Postmenopausal Females not on HRT: <10-28 pg/mL, Postmenopausal Females on HRT: <10-144 pg/mL
22	Ferritin	Males : 21.81-274.66 ng/mL Females : 4.63-204.0 ng/mL	男性: 21.81-274.66 ng/mL 女性: 4.63-204.0 ng/mL

23	FK-506 (Tacrolimus)	5 ~ 15 ng/ml	5 -15 ng/mL
24	Follicle Stimulating Hormone (FSH)	Males:0.95-11.95 mIu/ml; Females: Follicular phase:3.03-8.08 mIu/ml, Mid-cycle phase:2.55-16.69 mIu/ml, Luteal phase:1.38-5.47mIu/ml, Postmenopausal:26.72-133.4 1mIu/ml	男性: 0.95 - 11.95 mIU/mL 女性: Follicular Phase 3.03 - 8.08 mIU/mL Mid-Cycle Phase 2.55 - 16.69 mIU/mL Luteal Phase 1.38 - 5.47 mIU/mL Postmenopausal Females : 26.72 - 133.41mIU/mL
25	Folic acid	3.1-20.5 ng/mL	3.1-20.5 ng/mL
26	Free T4	0.70 ~1.48 ng/dL	0.70-1.48 ng/dL
27	Gentamicin	Peak: 5-10 ug/mL Through: <2 ug/mL	Peak: 5-10 µg/mL Through: <2 µg/mL
28	Glucose	Fasting(空腹血糖) : 70-99 mg/dL PC 2HR(飯後 2 小時血糖) : <140 mg/dL Random(隨機血糖):70-200mg/dL	Glucose,Fasting 70-99 mg/dL Glucose, PC 2HR <140 mg/dL Glucose,Random 70-200 mg/dL
29	Glucose- CSF	40-70 mg/dL	40 - 70 mg/dL
30	Glucose- Urine	Spot urine 1-15 mg/dL 24 hr urine < 500mg/24h	Random 1 - 15 mg/dL: 24 hour < 500 mg/day
31	HbA1c	(1)糖尿病前期, 5.7~6.4% ; (2)糖尿病, ≥6.5% ; (3)非妊娠成人糖尿病應控制在 < 7%	(1)糖尿病前期, 5.7~6.4% ; (2)糖尿病, ≥6.5% ; (3)非妊娠成人糖尿病應控制在 < 7%
32	HBeAg	< 1(cut-off value):non-reactive ≥ 1(cut-off value):reactive	< 1.00 S/CO Nonreactive ≥ 1.00 S/CO Reactive
33	HBsAg Qualitative test	< 1(cut-off value):non-reactive ≥ 1(cut-off value):reactive	< 1.00 S/CO Nonreactive ≥ 1.00 S/CO Reactive
34	HBsAg Quantitative test	< 0.05 IU/ml	<0.05 IU/mL
35	beta hCG	Non pregnant women: < 5 mIU/mL; Early pregnant: 5-25 mIU/mL ; Pregnant women: > 25 mIU/mL	Non pregnant women:< 5 mIU/mL; Early pregnant:5-25 mIU/mL ; Pregnant women:> 25 mIU/mL
36	Homocysteine	Male: 5.46-16.2µmol/L ; Female: 4.44-13.56 µmol/L	Male: 5.46-16.2µmol/L ; Female:4.44-13.56 µmol/L
37	Insulin	<30 µIU/mL	<30 µU/mL
38	Intact-PTH	15.0-68.3 pg/mL	15.0- 68.3 pg/mL
39	K, Potassium	25-125 mEq/24hr	25 - 125 mEq/day

	-Urine		
40	Lactate - CSF	10 - 25 mg/dL	10- 25 mg/dL
41	LDL-C	< 130 mg/dL	< 130 mg/dL
42	Luteinizing Hormone (LH)	Males: 0.57-12.07 mIU/ml; Females: Follicular phase:1.80-11.78 mIU/ml, Mid-cycle phase:7.59-89.08 mIU/ml, Luteal phase:0.56-14.00 mIU/ml, Postmenopausal Females without HRT:5.16-61.99 mIU/ml	Male: 0.57 - 12.07 mIU/mL Female: Follicular Phase 1.80 - 11.78 mIU/mL Mid-Cycle Phase 7.59 - 89.08 mIU/mL Luteal Phase 0.56 - 14.00 mIU/mL Postmenopausal Females not on HRT : 5.16 - 61.99 mIU/mL
43	P, Phosphorus -Urine	0.4-1.3 g/24hr	0.4 - 1.3 g/day
44	PRL, Prolactin	Males: 3.46-19.40 ng/mL; Females: 5.18-26.53 ng/mL	Males: 3.46-19.40 ng/mL; Females: 5.18-26.53 ng/mL
45	Progesterone	Males : <0.1-0.2 ng/ml; Normal Menstruating Females : Follicular Phase : <0.1-0.3 ng/ml, Luteal Phase : 1.2-15.9 ng/ml, Postmenopausal Females : <0.1-0.2 ng/ml; Pregnant Females: 1st Trimester : 2.8-147.3 ng/ml, 2nd Trimester : 22.5-95.3 ng/ml, 3rd Trimester : 27.9-242.5 ng/ml	Males : <0.1-0.2 ng/mL; Normal Menstruating Females : Follicular Phase : <0.1-0.3 ng/mL, Luteal Phase : 1.2-15.9 ng/mL, Postmenopausal Females : <0.1-0.2 ng/mL; Pregnant Females: 1st Trimester : 2.8-147.3 ng/mL, 2nd Trimester : 22.5-95.3 ng/mL, 3rd Trimester : 27.9-242.5 ng/mL
46	PSA, Prostate Specific Ag	< 4.0 ng/mL	≤ 4 ng/mL
47	SCC	< 2.1 ng/ml	< 2.1 ng/mL
48	Sirolimus	5 ~ 15 ng/ml	5 -15 ng/mL
49	T4	4.87- 11.72µg/dL	4.87-11.72µg/dL
50	Testosterone	Males : 21-49yrs:2.40-8.71 ng/mL; ≥ 50 yrs:2.21-7.16 ng/mL Females : 21-49yrs:0.14-0.53 ng/mL; ≥ 50 yrs:0.124-0.36 ng/mL	Males : 21-49yrs:2.40-8.71 ng/mL; ≥ 50 yrs:2.21-7.16 ng/mL Females : 21-49yrs:0.14-0.53 ng/mL; ≥ 50 yrs:0.124-0.36 ng/mL
51	Total Bilirubin	0.2 - 1.2 mg/dL	0.2 - 1.2 mg/dL

52	Triglyceride	< 150 mg/dL	<150 mg/dL
53	Uric Acid, Urine	250-750 mg/24hr	Average diet 250-750 mg/day
54	Vancomycin	Trough: 10~20µg/mL Peak: < 40µg/mL 註:使用於成人時之相關建議如下: 1.trough concentration 應> 10µg/mL 以避免產生抗藥性。 2.侵襲性感染或致病菌的 MIC >1µg/mL, 建議 trough concentration 控制於 15-20µg/mL	Trough: 10~20µg/mL Peak: < 40µg/mL 註:使用於成人時之相關建議如下: 1.Trough concentration 應> 10µg/mL 以避免產生抗藥性。 2.侵襲性感染或致病菌的 MIC >1µg/mL, 建議 trough concentration 控制於 15-20µg/mL
55	Valproic Acid	50 ~ 100 ug/ml	50 - 100 µg/mL
56	Vitamin B12	187-883pg/mL	187-883 pg/mL

四、急診檢驗項目(含治療用藥物及個別相關係數)

y=Abbott (新方法);x= 舊方法

項目	舊參考區間	新參考區間	相關係數
Acetaminophen	Therapeutic : 10-30 ug/mL Toxic : Possible toxicity >100 ug/mL ; Probable toxicity >200 ug/mL	治療濃度: 10 ~ 20µg/mL 中毒濃度: 攝入後 4Hrs >150µg/mL 攝入後 12Hrs > 40µg/mL	$y=1.0772x + 1.0256$ $R^2=0.9958$
Alcohol	Negative : <10 mg/dL 。 Toxicity : 50 – 100 mg/dL : 臉頰泛紅;反射動作緩慢;視 覺靈敏度降低。 Depression of CNS : >100 mg/dL Fatal Result : >400 mg/dL	< 30.0 (mg/dL)為法規標準	$y=0.9314x + 2.5448$ $R^2=0.995$
Amikacin	Peak : 20-25 ug/mL Peak toxic : 35 ug/mL Trough : 5-10 ug/mL Trough toxic : 10 ug/mL	Peak: 25 – 35µg/mL Trough: 4 – 8µg/mL	$y=0.9387x + 0.823$ $R^2=0.9964$

beta HCG	Non pregnant women: < 5 mIU/mL; Early pregnant: 5-25 mIU/mL; Pregnant women: > 25 mIU/mL	Non pregnant women: < 5 mIU/mL; Early pregnant: 5-25 mIU/mL; Pregnant women: > 25 mIU/mL	
Carbamazepine	8 - 12 µg/mL	4 – 12µg/mL Toxic: >15µg/mL	$y=0.925x + 0.9344$ $R^2=0.9896$
CKMB	< 16 U/L	Male: ≤ 5.1 ng/mL Female: ≤ 3.4 ng/mL	
Digoxin	0.9 – 2.0 ng/mL	therapeutic effects: 0.8 - 2.0 ng/mL	$y=0.9724x + 0.0087$ $R^2=0.9943$
Lithium(Li)	0.5 – 1.2 mEq/L	1.0 - 1.2 mEq/L	$y=1.3539x + 0.1556$ $R^2=0.9958$
Myoglobin	Male: <78 ng/ml Female: <47 ng/ml	Male: <154.9ng/mL Female: <106.0ng/mL	
Phenobarbital	15 - 40 µg/mL	Therapeutic range: 15 - 40 µg/mL 35 – 80µg/mL (Associated with slowness, ataxia & nystagmus) 65 – 117µg/mL (Associated with coma with reflexes) >100µg/mL (Coma without reflexes)	$y=0.8188x + 1.7382$ $R^2=0.9909$
Phenytoin	Adult : 10-20 µg/mL 3 years : 6-14 µg/mL	Therapeutic range: 10 - 20 µg/mL Toxic: >20 µg/mL	$y=1.0509x + 0.1782$ $R^2=0.9860$
Salicylate	Negative : 0 mg/dL Therapeutic : < 30 mg/dL Toxicity : > 35 mg/dL	Therapeutic: 15 - 30 mg/dL Toxic Levels:> 30 mg/dL Lethal:> 70 mg/dL	$y=1.0963x - 1.3911$ $R^2=0.9986$
Tricyclic anti-depressant, TCA	125-250 ng/ml	Therapeutic range:50.00 to 100.00 ng/mL Toxic: >500 ng/mL	$y=0.8211x + 14.788$ $R^2=0.9879$
Theophylline	5-20 ug/mL	Therapeutic concentrations:8 - 20 µg/mL Toxic: >20 µg/mL	$y=0.9743x + 0.9106$ $R^2=0.9965$